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Stairway to SDG

Online International Teacher Training
SDE & SDGs in VET

Stairway to SDG

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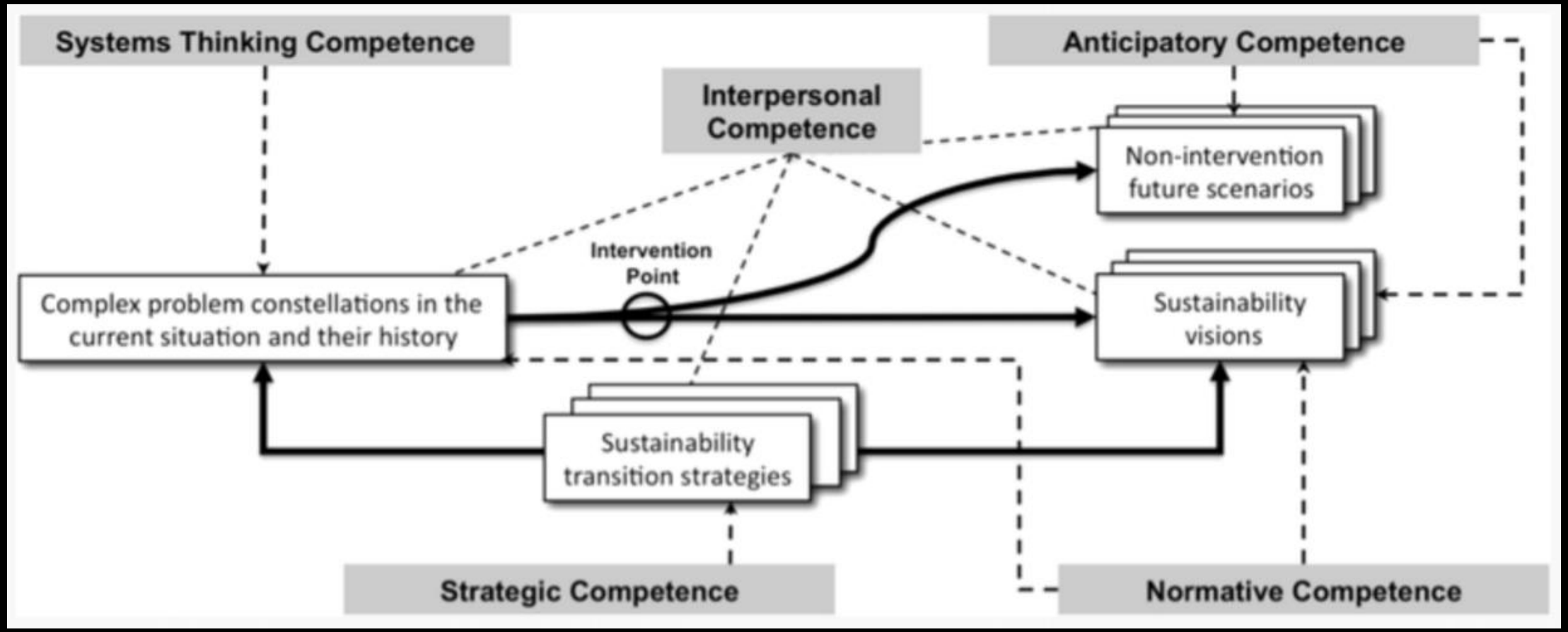
Welcome to Module 2
Introduction to systems thinking and future thinking in VET

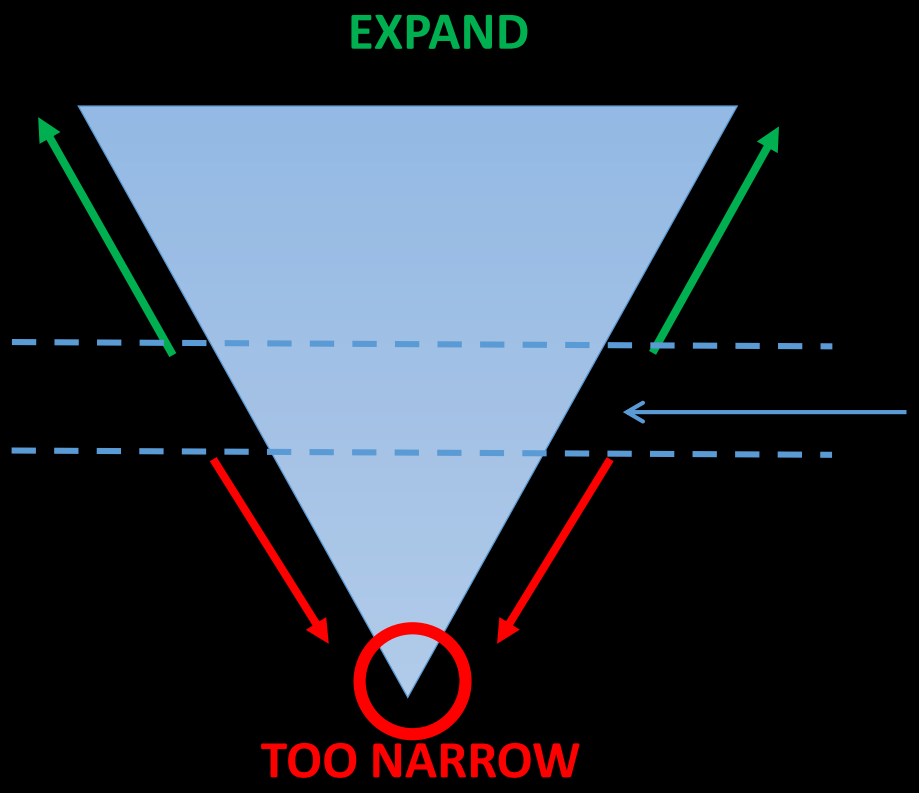
Sustainability competences: giving students a compass to tackle sustainability issues



Key competencies in sustainability: a reference framework for academic program development

Arnim Wiek · Lauren Withycombe · Charles L. Redman

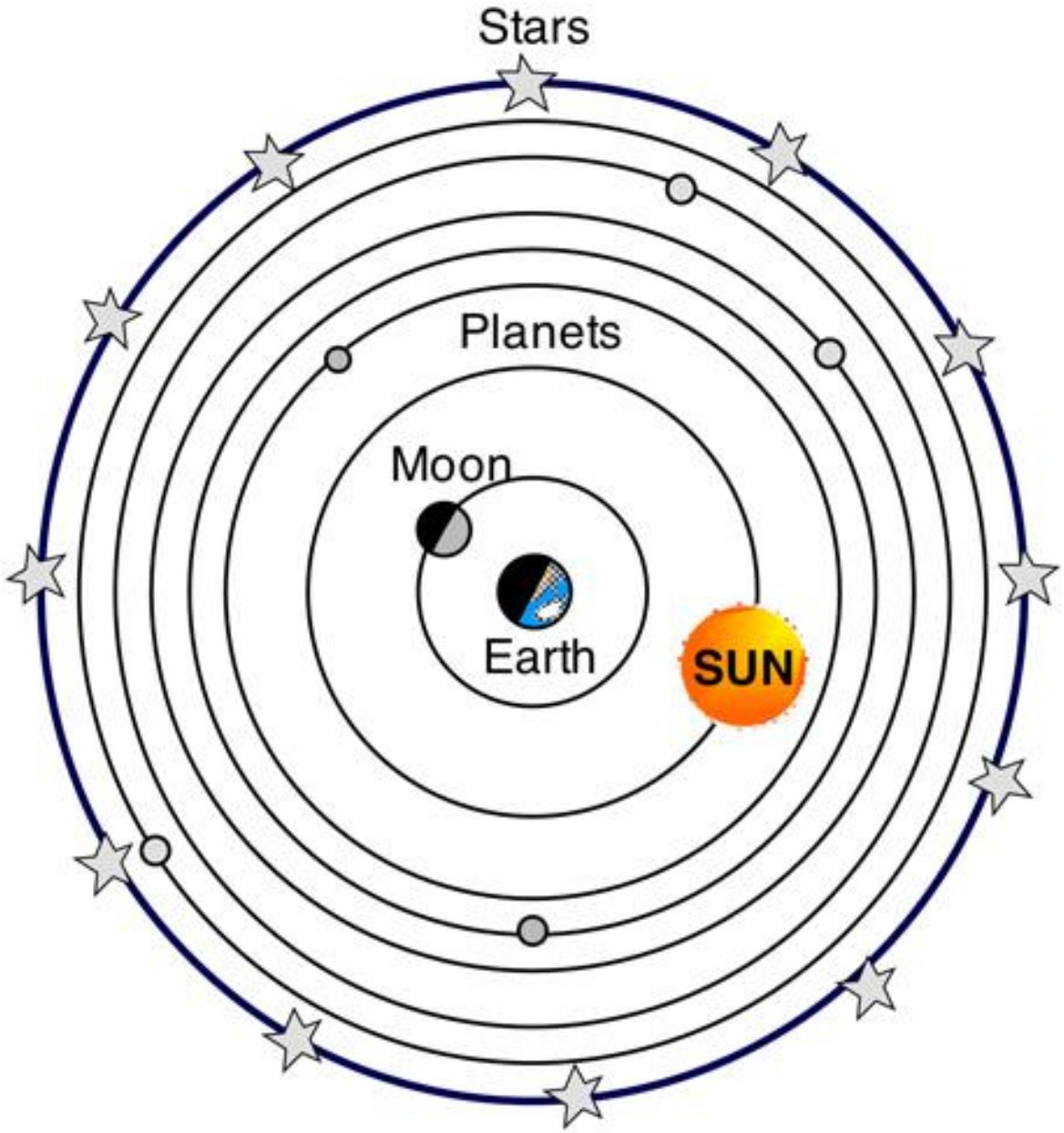
The reversed triangle



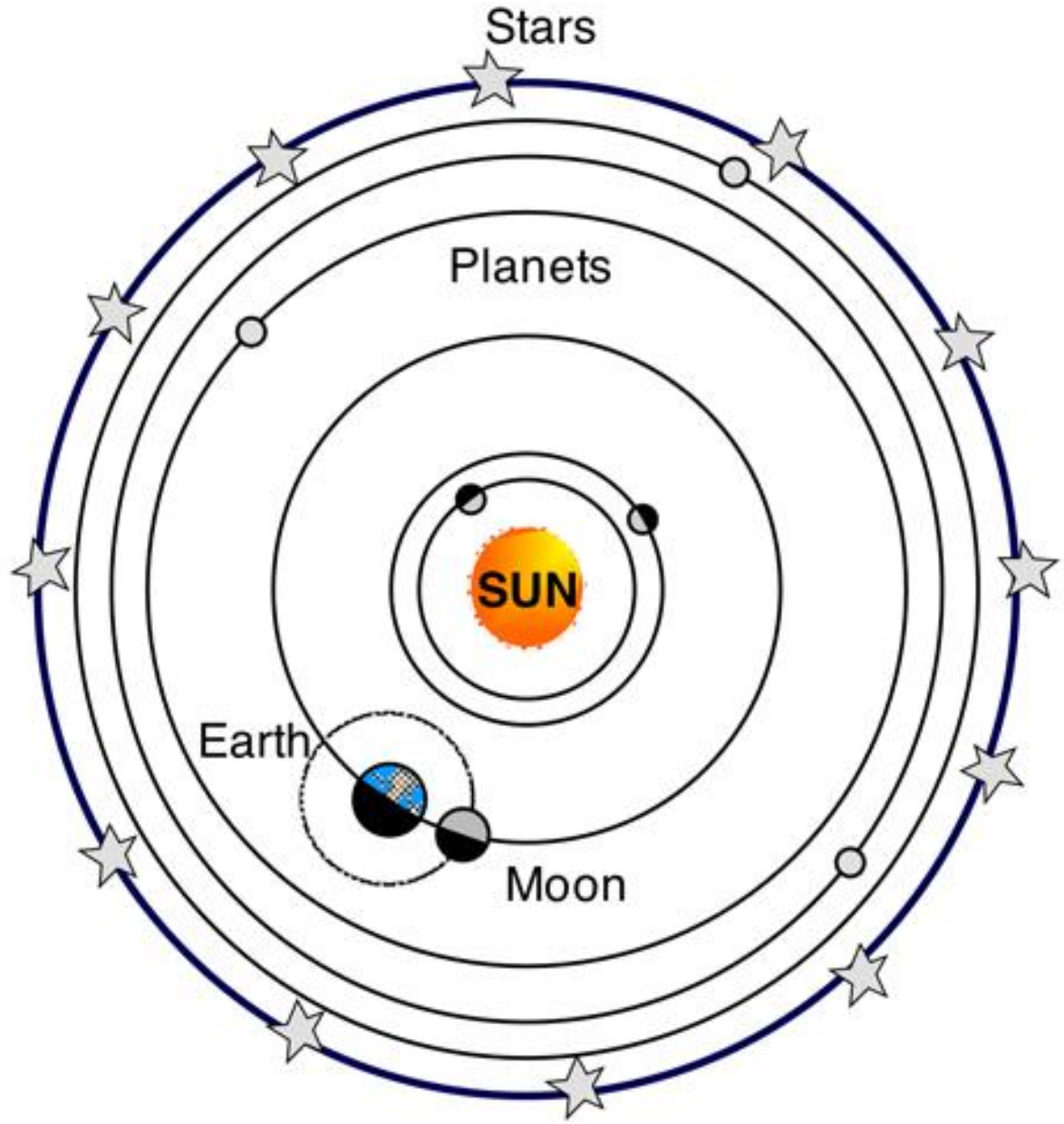
Several perspectives and solutions (systems-thinking, future thinking)

SUSTAINABILITY CASE

‘the solution’



Geocentric Theory



Heliocentric Theory

Scenario 1

Sustainable vocational school 1.0

Scenario 2

Sustainable vocational school 2.0

Scenario 3

Sustainable vocational school 3.0

Sustainable vocational school 1.0	Sustainable vocational school 2.0	Sustainable vocational school 3.0
• Reactive approach/ ad hoc actions • No systemic approach • Sustainability is a concept that is known in the organization but only applied sporadically • ”We continue working as we are used to (‘Business as usual’) and integrate sustainability if necessary.” • 3P	• Proactive • Strategic-systemic approach • Strategic actions in the present for a more sustainable future • Sustainability is a concept well known and is implemented to support the strategy of the organization • ”We integrate sustainability if it serves a strategic goal” • Sustainable development	• Proactive • Eco-systemic approach • Actions in the present for systemic change • Sustainability is core for the organization , for all departments and all decisions • ”Sustainability is the guiding principle in our organization and the focus of all our decisions” • Doughnut model

Henssen, Jassogne, Crois, 2020

Scenario 1: Vocational school 1.0

- Education: Investing in lifelong learning, but curricula are not adapted to SD (ad hoc actions of individual teachers)
- Campuses: Infrastructure can be expanded, online teaching as reponse to infrastructural limits, ad hoc sustainability actions
- Projects (and research): Sustainability is a (project/research) topic, because government asks this (reactive). We adapt projects if necessary. International collaboration is an added value but not a necessary condition to work on sustainability issues.
- Focus on economic goals rather that on social or ecological impact.

Scenario 2: Vocational school 2.0

- Education: Lifelong learning is promoted and integration of sustainability in the curriculum
- Campuses: no unlimited expansion of infrastructure. Expansions are future proof, flexibel and ecological. Online learning is more important.
- Projects (and research): international collaboration and projects are assessed based on the added value to realize the strategic sustainability goals
- Sustainability goals are written in strategy. Searching for a balance between economic and ecological/social goals. Sustainable transition is necessary, not because of conviction but because it is important strategically.

Scenario 3: Vocational school 3.0

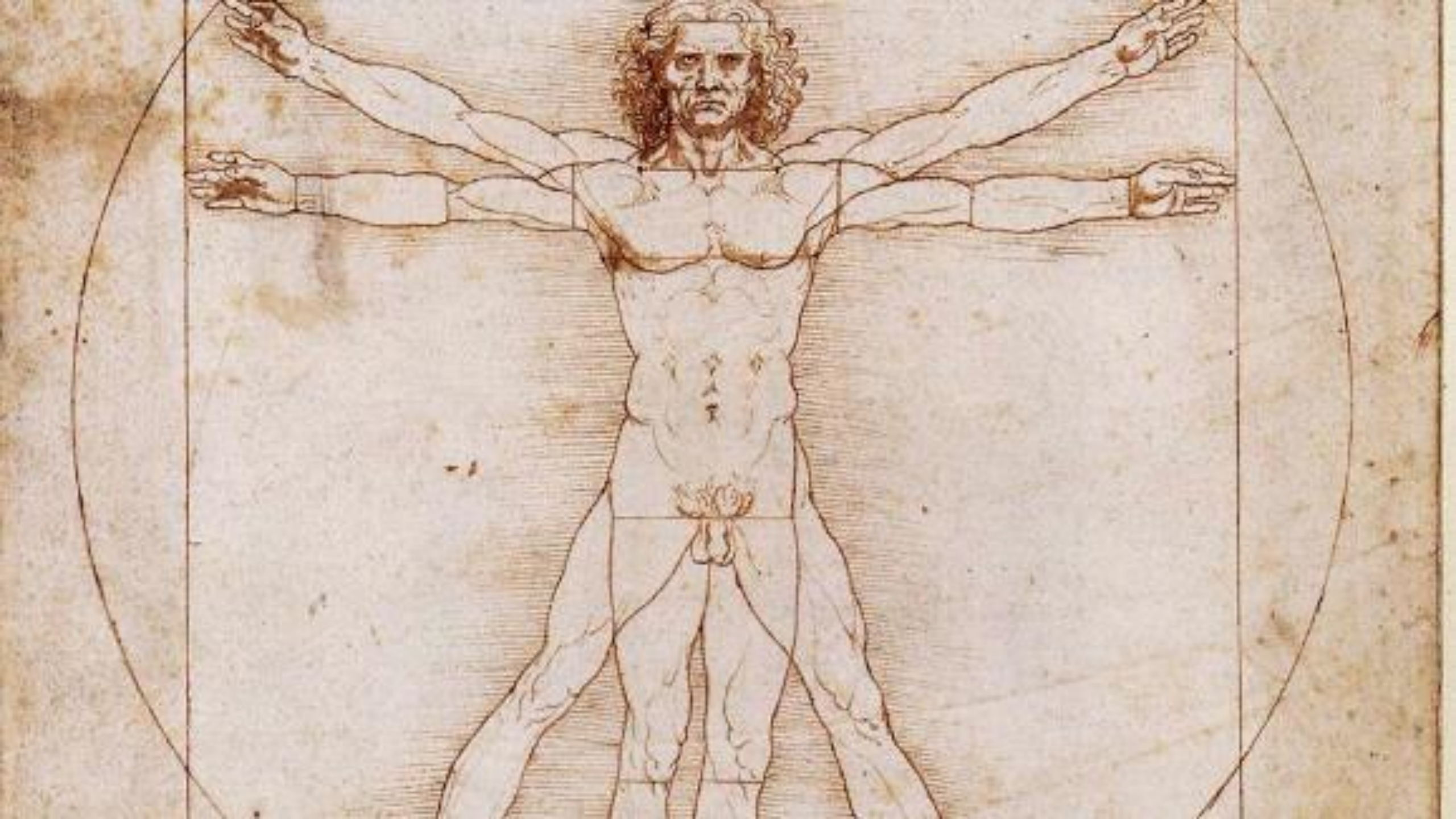
- Education: lifelong learning is crucial and sustainability is integrated in all curricula
- Campuses: infrastructure can only be expanded if it serves ecological and social purposes. Existing infrastructure is adapted or replaced: zero waste and zero emission campuses.
- Projects (and research): international focus because it is the only way to work on sustainability issues. Open science and ethical research.
- Ecological and social goals are more important than economic goals. Less managerialism, more emphasis on ecological and social impact.

Systems thinking and sustainability

No single company, NGO or government can drive the change necessary to tackle environmental, social and economic change that is necessary to deal with the many challenges nowadays

Recognition of inter-dependency & co-ordination across all parts of the system we want to change

Wicked problems

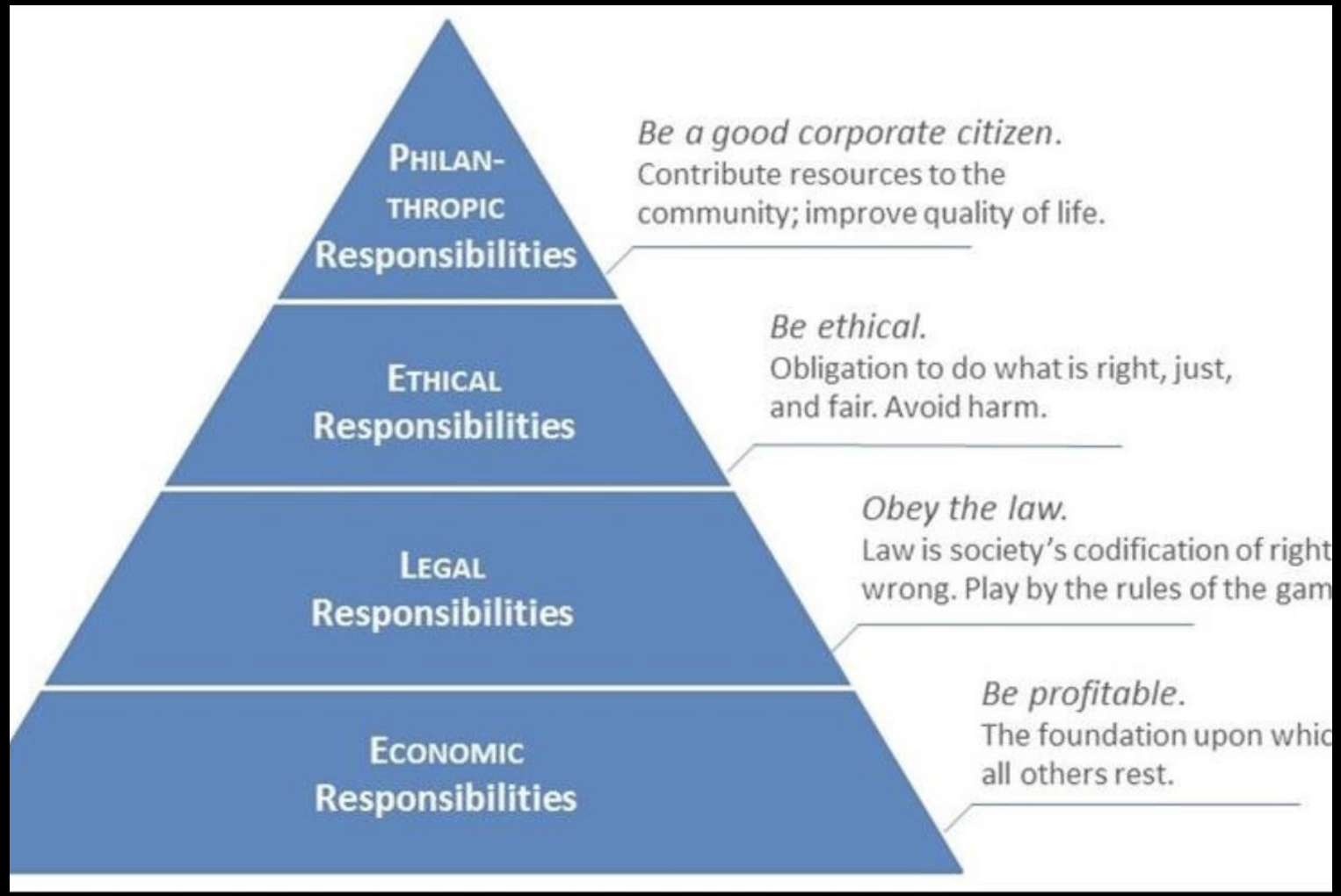


Core concepts.

Short Description	Representative Articles	Future Research Questions
Interconnectedness Organizations are agents in interconnected social, economic and ecological systems. Recognition of the complexity of interconnected social and ecological problems is critical for achieving sustainability.	Davis et al., 2009 Metcalf and Benn, 2013 Sterman, 2001 Valente, 2010, 2012	Develop conceptual models to understand connections What tools can help leaders identify interconnections that close loops in industrial networks?
Feedbacks Interaction with and reaction to feedbacks causes nonlinear dynamics and the emergence of complex behaviors overtime. Understanding feedbacks as underlying governance mechanisms can inform decision making.	Sterman, 2001 Valente, 2010 Whiteman et al., 2004	Develop methods to understand the impact of long term social-ecological feedbacks Analyze the impacts of indirect social-ecological feedbacks on the resilience of the firm
Adaptive Capacity/Resilience Adaptive capacity ensures the survival of the system when agents learn from their experience and act accordingly. Organizations must adapt to changing environmental conditions such as climate change.	Ashton, 2009 Beermann, 2011 Valente, 2010 Winn et al., 2011	Determine the thresholds between adaptive capacity and transformation Examine the costs and benefits of building long term resilience
Self- Organization Self-organizing systems develop their own structure and behavior spontaneously without being guided from the top-down. Self-organization leads to emergence in complex adaptive systems.	Batten, 2009 Sterman, 2001 Rotmans and Loorbach, 2009 Whiteman et al., 2013	Identify what micro-processes underlie self-organization in social systems Determine the cross-scale impacts of self-organization
Emergence Emergence is the result of lower level interactions when the system is pushed out of equilibrium. Existing structures can hinder future emergence.	Dougherty and Dunne, 2011 Ehrenfeld, 2007 Huo and Chai, 2008 Rotmans and Loorbach, 2009	Understand what conditions lead to an emergence enabling disequilibrium When does self-organization lead to the emergence of sustainable innovations?

If a factory is torn down but the rationality which produced it is left standing, then that rationality will simply produce another factory. If a revolution destroys a government, but the systematic patterns of thought that produced that government are left intact, then those patterns will repeat themselves. . . . There's so much talk about the system. And so little understanding.

—Robert Pirsig, *Zen and the Art of Motorcycle Maintenance*



What is the role of an organization in the system?

(Caroll, 1979)

“The social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time.” (Caroll, 1979)

Responsibility	Societal Expectation	Examples
Economic	Required	Be profitable. Maximize sales, minimize costs, etc.
Legal	Required	Obey laws and regulations
Ethical	Expected	Do what is right, fair and just
Discretionary	Desired/expected	Be a good corporate citizen

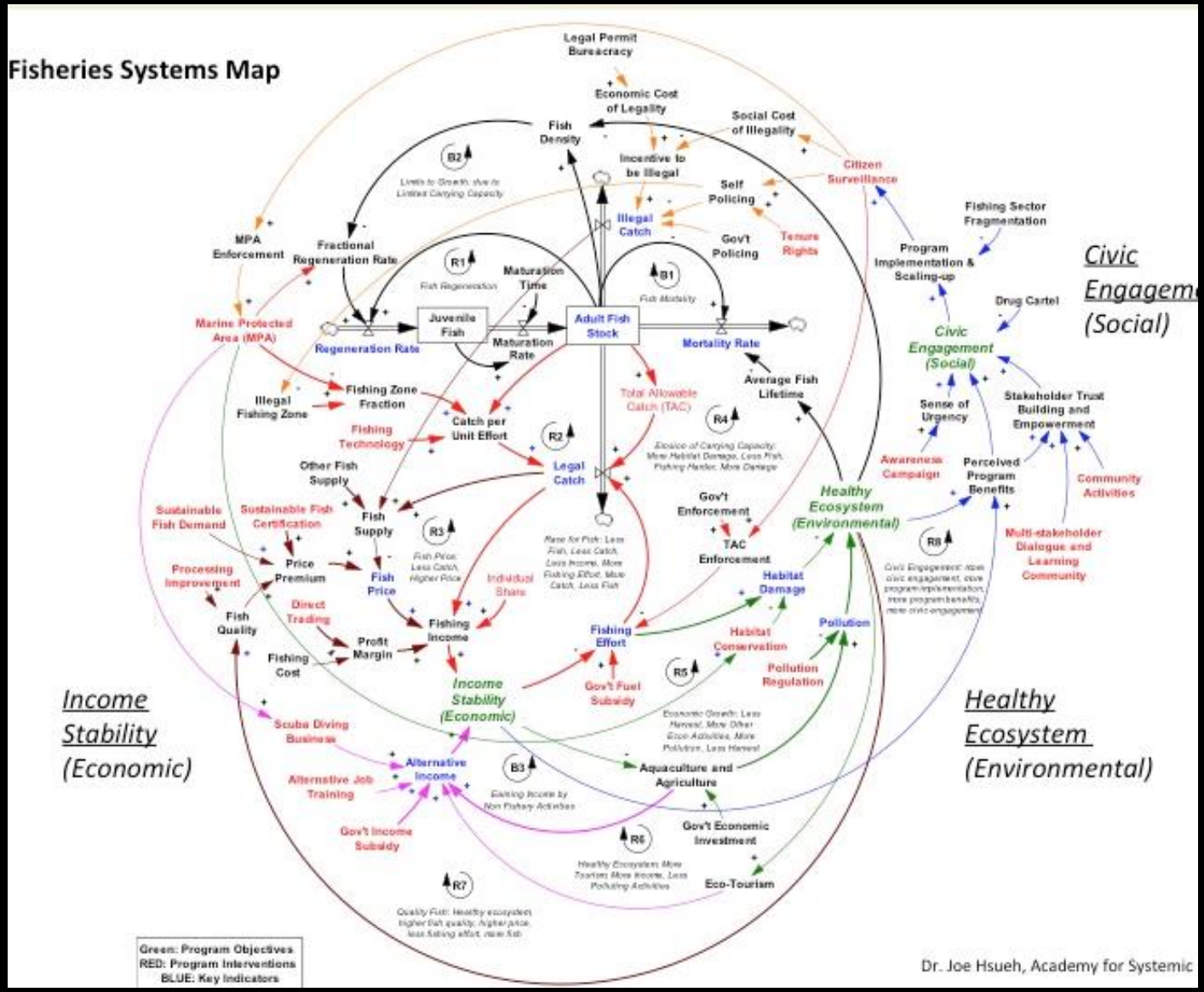
How to map the system?

1. Draw the system (see next slides for examples)
2. Insert your ‘wicked problem’ into the system and see what happens in the system
3. Draw conclusions on systemic outcomes of your strategic decisions

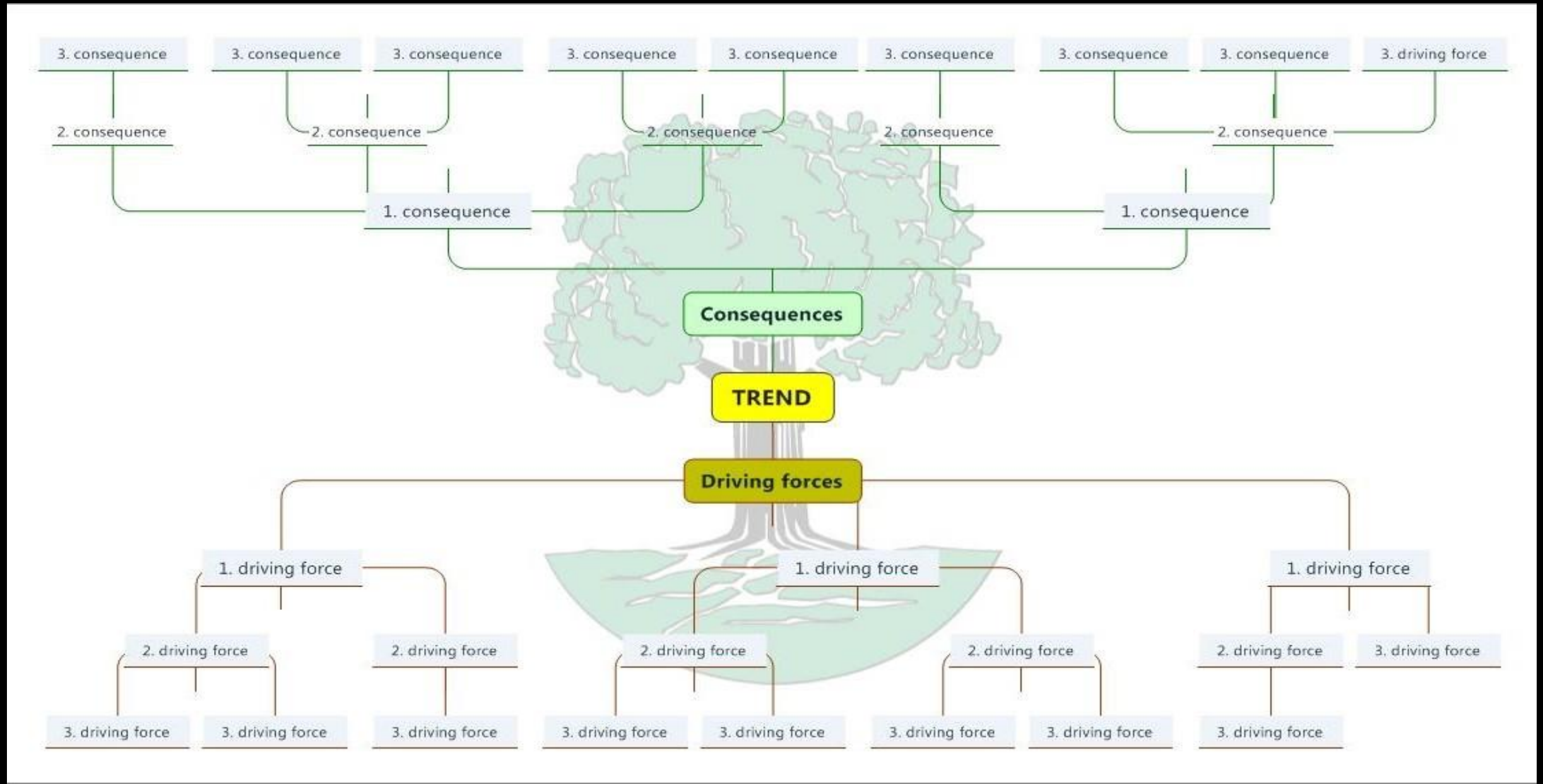
http://systems.geofunders.org/systems-resources/systems-mapping

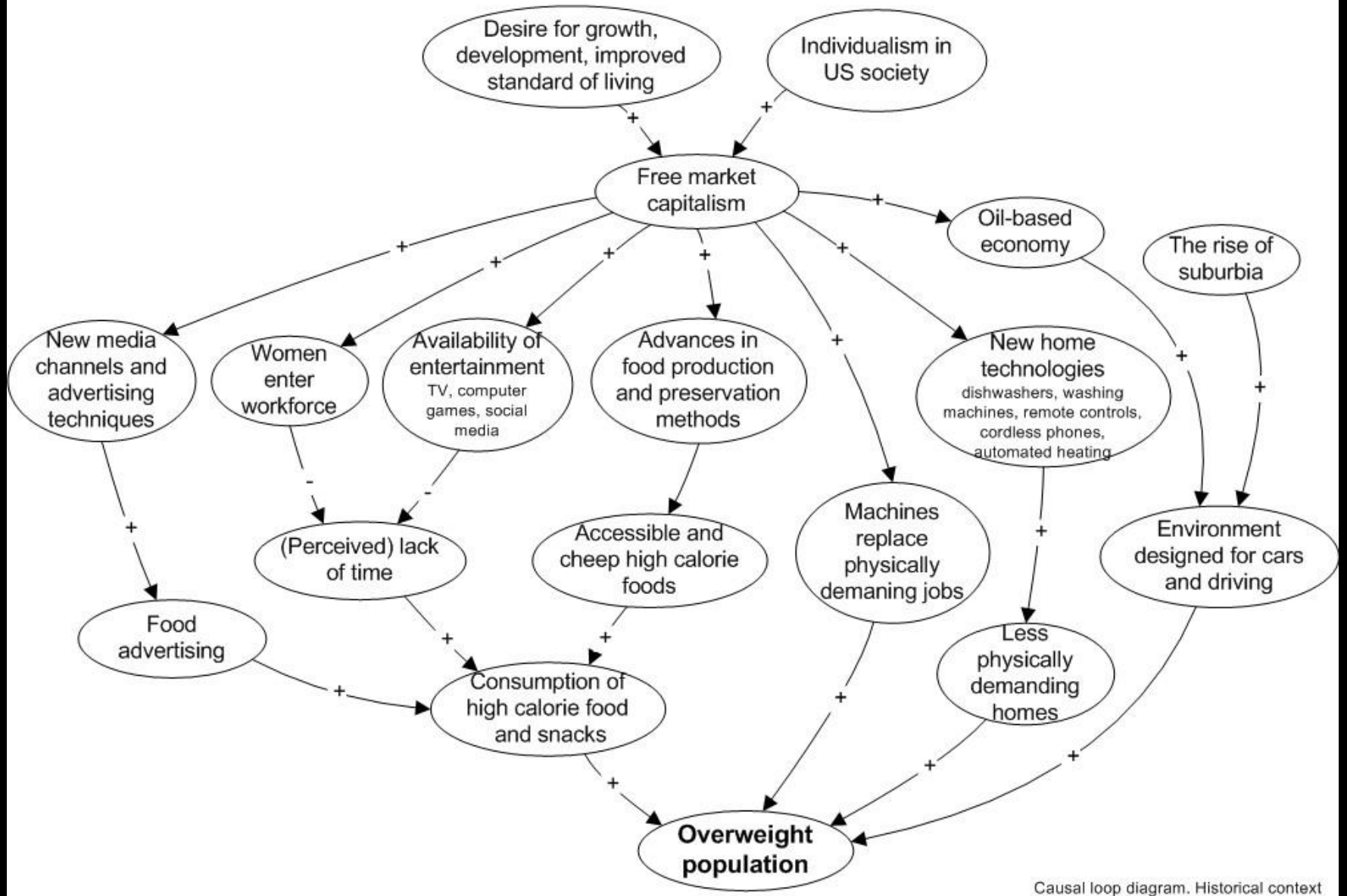
http://www.academyforchange.org/wp-content/uploads/2013/09/Systemic-Change-Process-Map-08_2013.pdf

http://www.academyforchange.org/wp-content/uploads/2012/08/Fishery-Causal-Loop-Diagram-2011.9.pdf

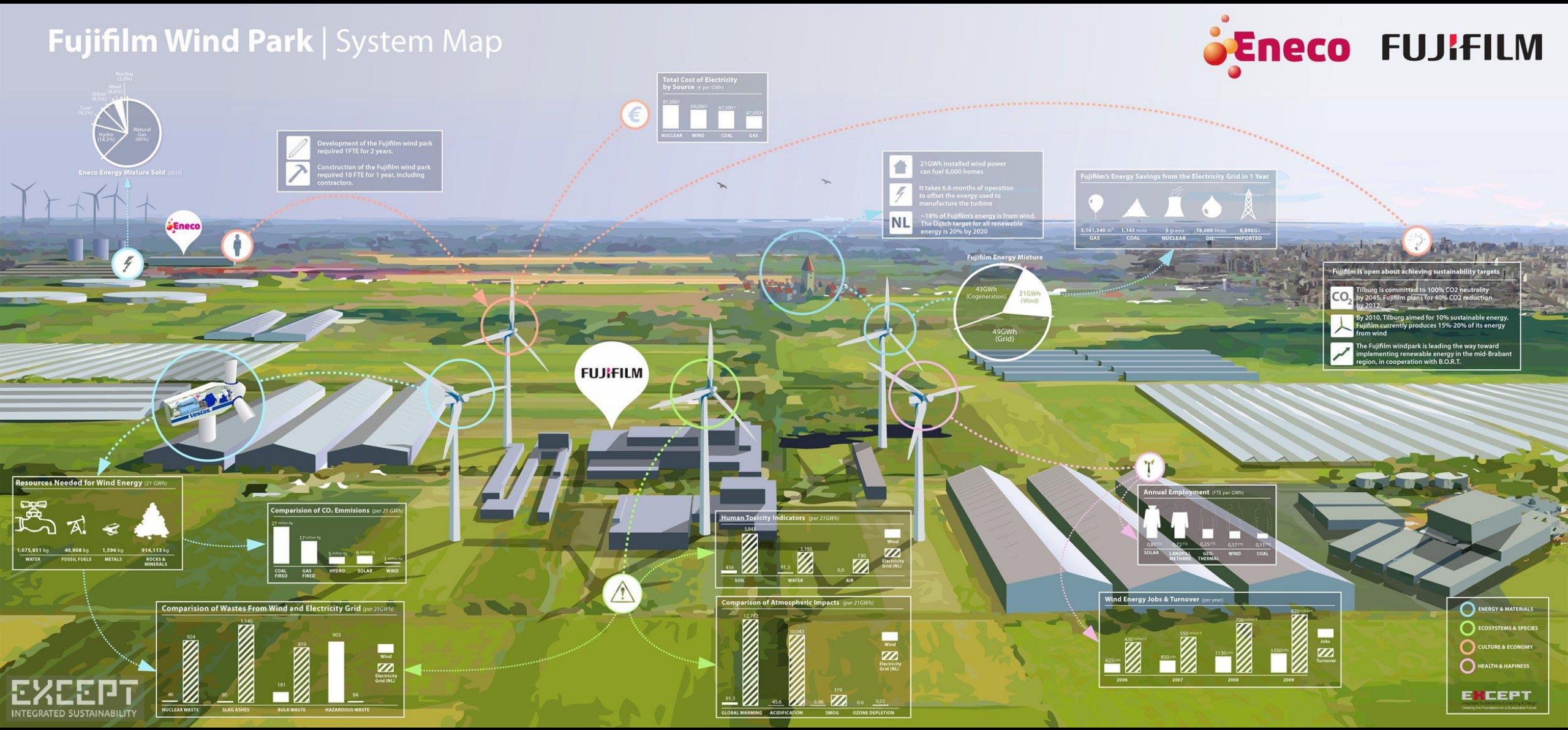


A ‘consequence tree’





Causal loop diagram. Historical context



http://www.except.nl/en/services/161-circular-economy-systems-mapping


P
O
L
K
return
apply

Coffee break

10 min.

Outside-in:
Future scenarios and backcasting

From second curves to scenarios

”You must understand the sources of the second curve, a phenomenon that is fueled by massive forces of change over which you have no control: new technology, new consumers, and new markets… the second curve will fundamentally change the threats and opportunities you face.

To survive, not to mention succeed, you have to learn to anticipate these changes.”

(Ian Morrison, Institute for the Future; 1996)

Odisee
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What is scenario planning?

”A tool [for] ordering one’s perceptions about alternative future environments in which one’s decision might be played out right” (Schwartz, 1991).

”A disciplined method for imagining possible futures in which organizational decisions may be played out (Shoemaker, 1995).

It is NOT a forecast or a vision

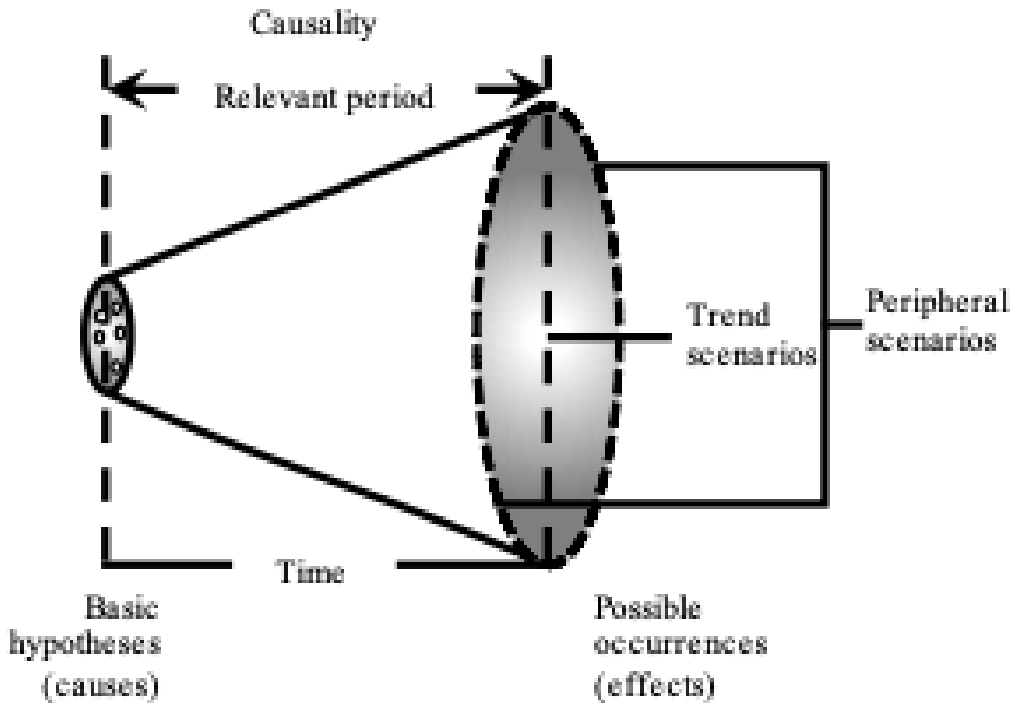
Backcasting

Backcasting scenarios develop from the opposite direction, which are prescriptive in nature, using deductive reasoning, with anticipatory analyses (Biggs, et al., 2007). These scenarios focus on a future event and build a logical, storied, flow back to the present state to help determine the path needed to reach the future event (Bishop et al., 2007).

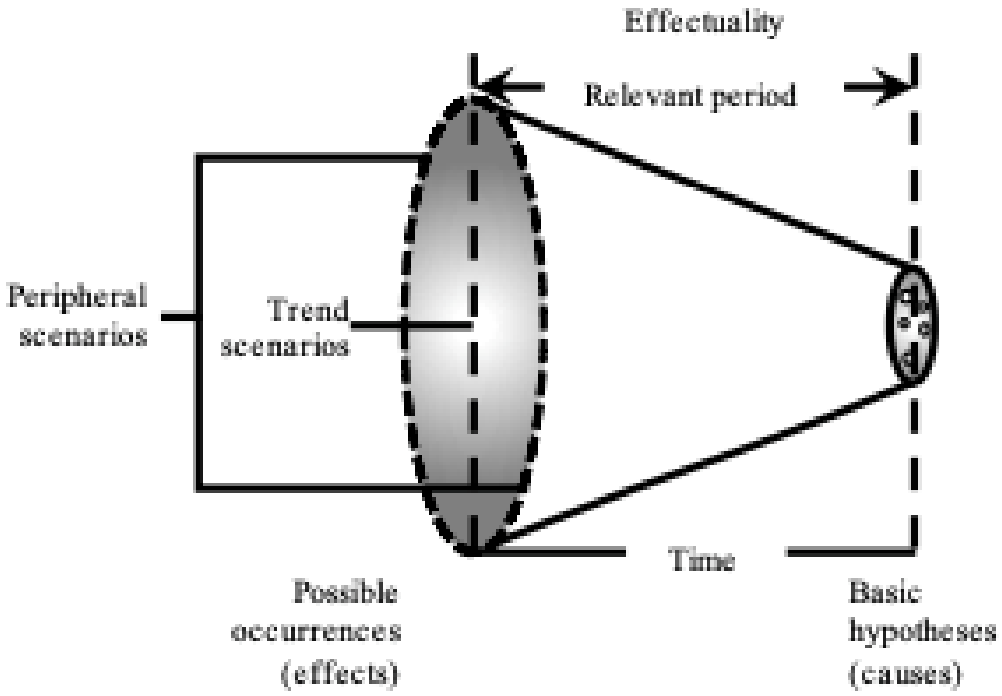
ideal and *crisis focused* futures

Fig. 1. Ducot and Lubben's (1980) exploratory (1a) and anticipatory (1b) scenario spaces.

1a



1b

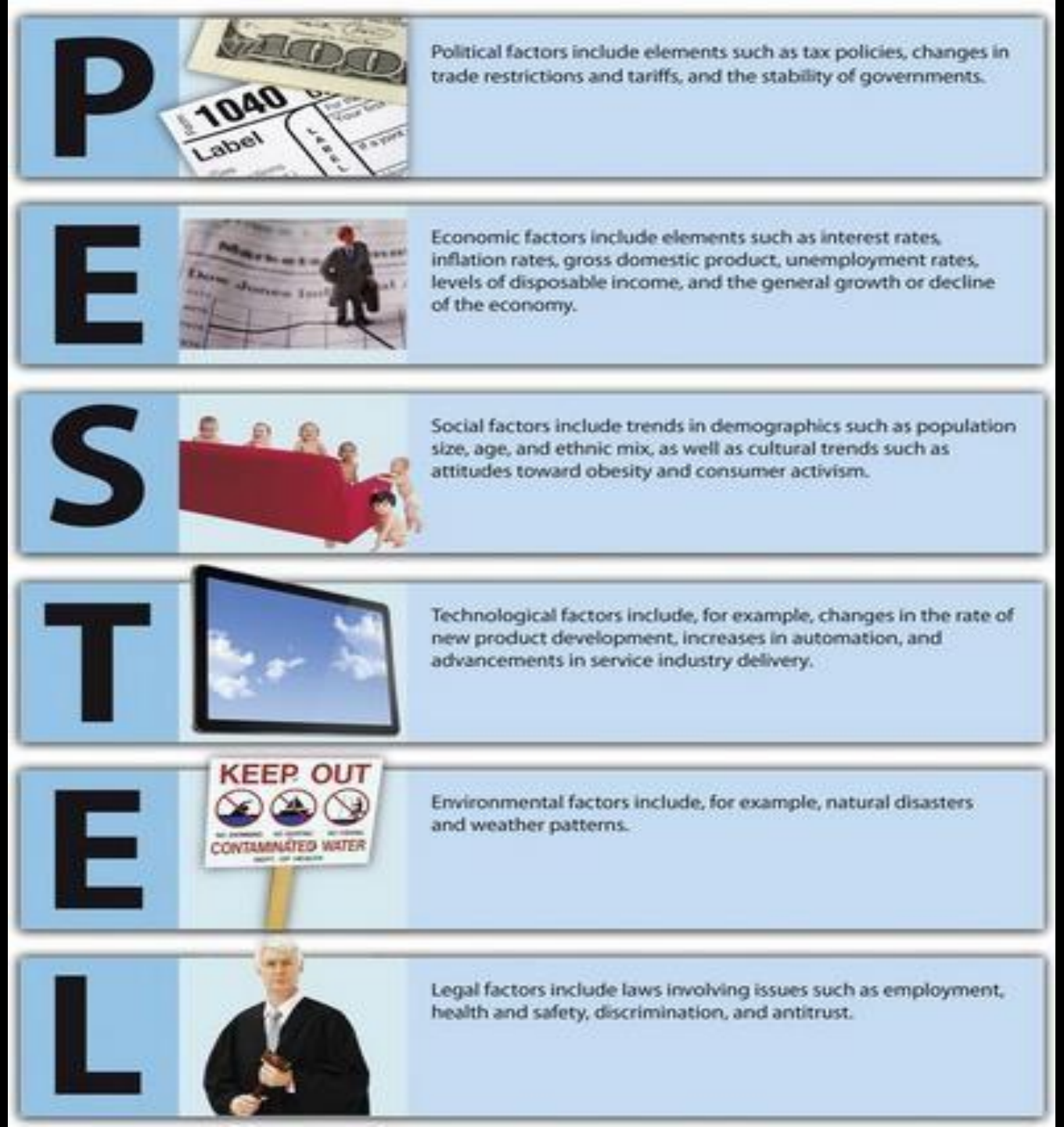


Note: Trend scenarios are represented by the lighter area in the middle of the cone. Peripheral scenarios are represented by the darker area that spreads out to the edges of the cone.

Identifying trends

- Identify trends, not fads, fears or dreams! (express ‘with direction’)
- Brainstorm, use a mix of ’outsiders’ and ’insiders’!
- Adapt strategy tools such as PESTEL, but emphasize change!
- Draw a ’map’ of the system you are focusing on*.

- * or: a ’causal loop’ diagram.



https://www.professionalacademy.com/blogs-and-advice/marketing-theories---pestel-analysis

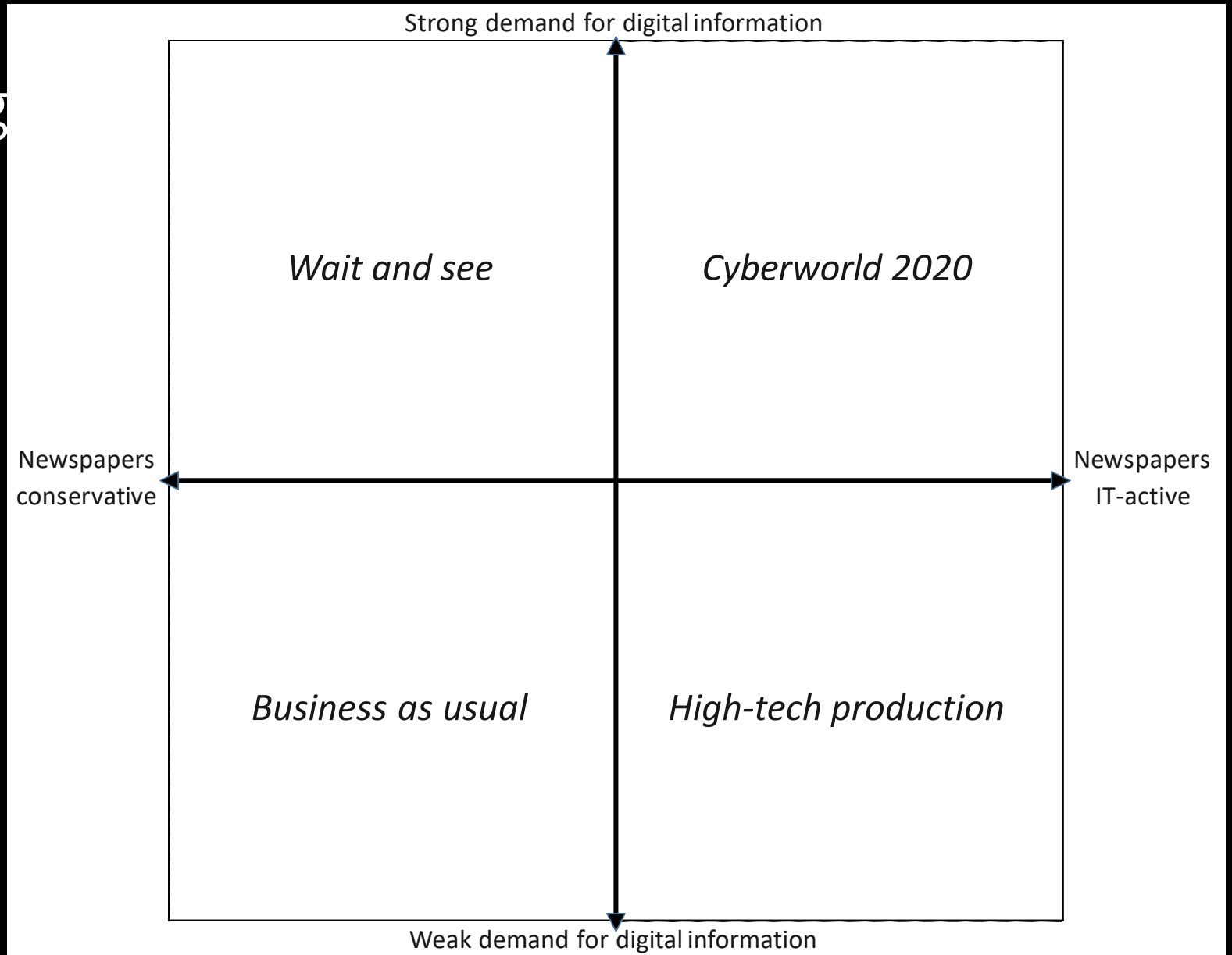
PESTEL

	Factors	Implications
Political	1. 2. 3. etc	1. 2. 3.etc
Economic	1. 2. 3. etc	1. 2. 3. etc
Social	1. 2. 3. etc	1. 2. 3. etc
Technological	1. 2. 3. etc	1. 2. 3. etc
Legal	1. 2. 3. etc	1. 2. 3. etc
Environmental	1. 2.	1. 2.

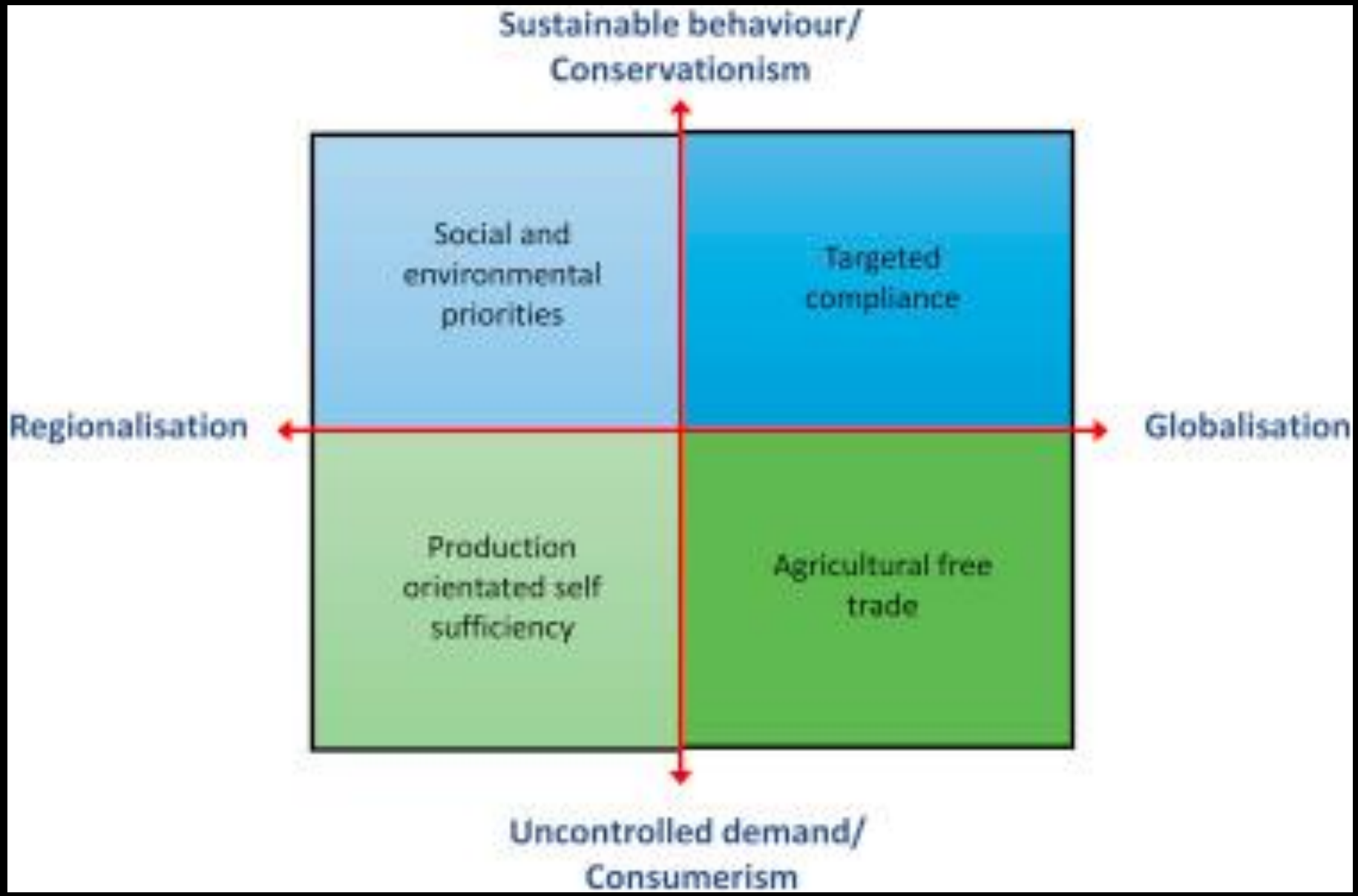

P
O
L
K
return
apply

From trend-tracking to scenarios

- Draw a four-fielder using 2 of the key trends
- Give them a catchy name
- Write a narrative/story describing ‘life’ or the organization in each of the four ‘futures’



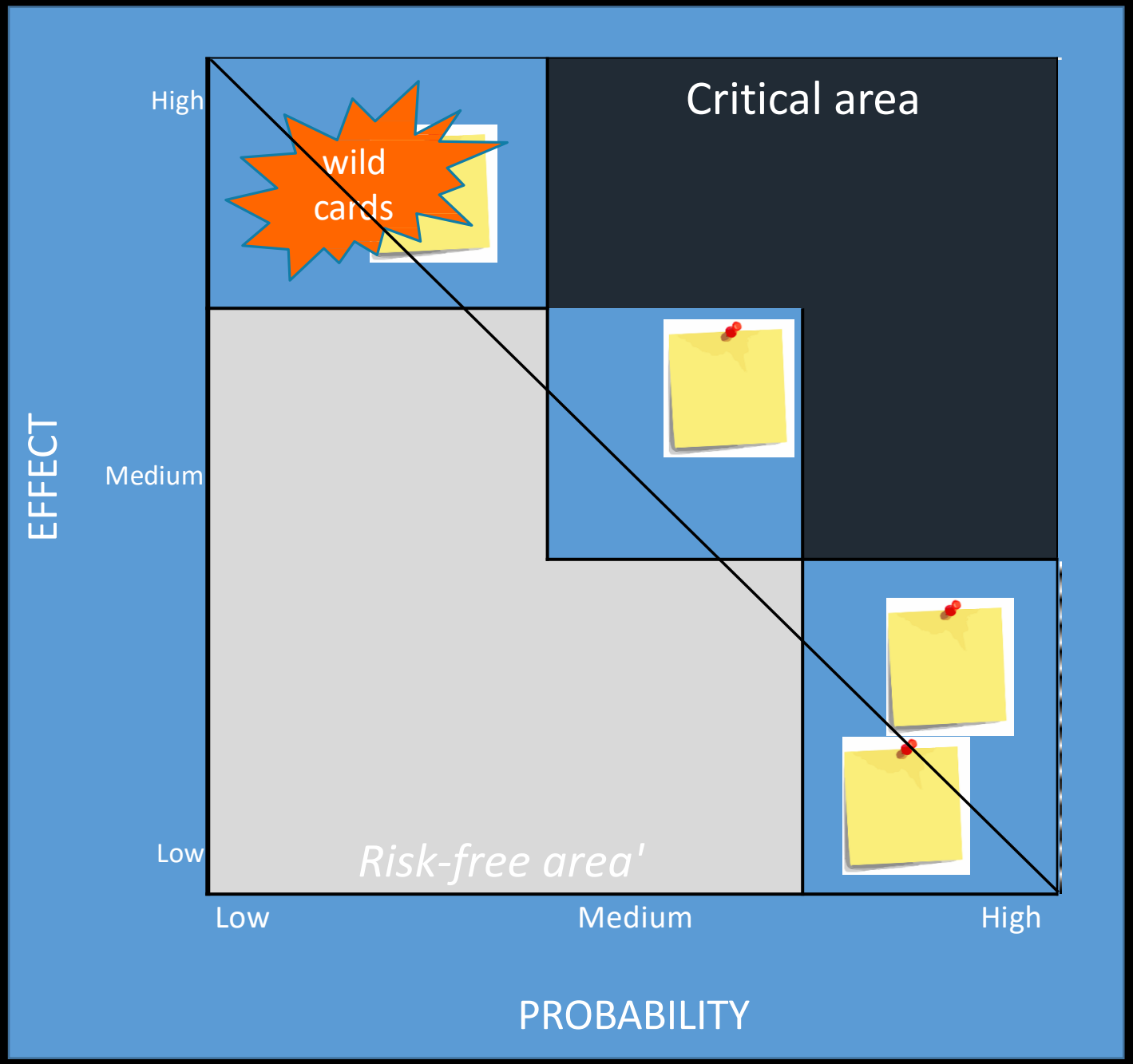
Four scenarios on the future of daily newspapers (Lindgren & Bandhold 2003)



Knox et al., 2018 Advances in Chemical Pollution, Environmental Management and Protection

Which trends should we include in our scenarios?

- Draw the matrix on a flipchart / whiteboard.
- Write each trend or variable on a ’sticky note’.
- Place each trend or variable on the matrix.



Additional inspiration

https://www.sciencedirect.com/topics/earth-and-planetary-sciences/scenario-analysis

https://www.mindtools.com/pages/article/newSTR_98.htm

https://www.asisonline.org/security-management-magazine/articles/2019/10/how-to-use-scenario-analysis-to-manage-in-uncertain-times/

https://www.youtube.com/watch?v=3OHWh0SFn7U

https://www.youtube.com/watch?v=Hrdh34Up68o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